REMARKS

Claims 11-19 are pending.

For the convenience of the Examiner, attached at the end of this document is a clean "Claims Appendix" of the current wording of all pending claims.

This Amendment is responsive to the Office Action of the Examiner mailed December 2, 2002.

This is a First Action on a Request for Continuing Prosecution; applicants understand that their submission filed on October 30, 2002 has been entered.

In the remarks that follow, applicants will first address the specific objections raised by the Examiner to now-amended claim 11. Thereafter, the invention of claim 11 will be summarized in detail with frequent reference to Figs. 1, 2 and 3. Finally, Streiff '644 will be distinguished.

Claim Rejections - 35 USC 112, second paragraph

The Examiner questions applicants' statement in Paper No. 8 that "the projections do not form joint locations". This is compared to an apparent inconsistency in now-amended claim 11. The inconsistency was "the other continuous joint surface including a projection".

The Examiner's attention is respectfully requested to Figs. 1 and 2. In Fig. 1, the Examiner is asked to observe surfaces 40a and 40b. It will be observed that these surfaces are "continuous joint surfaces". That is to say, they completely surround the central mixing channel of the mixer assembly when these surfaces are juxtaposed. These surfaces do not support a projection; they instead have cut-outs 42.

In Fig. 2, the Examiner is asked to view surface 20a. It will be observed that these surfaces are "continuous joint surfaces". That is to say, they completely surround the central mixing channel of the disclosure when these surfaces are juxtaposed. Surfaces 40b and 20a will define a seal formed between "the first and second continuous joint surfaces". Surface 20a does support a protrusion 21. Thus the question of the

immediately preceding paragraph is answered. Of the two continuous joint surfaces which come together to form a seal, one surface has cut-outs while the remaining surface supports a protrusion.

The Examiner then questions "if the projections and cut-outs do not form the joint locations, why do the claims recite "one joint surface including a cut-out" and "the other continuous joint surface including a projection". Again, the Examiner is respectfully requested to view Figs. 1 and 2. First, viewing Fig. 2 at projections 21, it can be understood that the projections 21 do not form a part of the surface 20a. Thus when surface 20a mates with surface 40b to "mutually define a seal", projections 21 formed no part of that seal. Indeed, as amended claim 11 is summarized, it will be carefully set forth that the cut-outs (42) [see Fig. 1] and the projections (21) [see Fig. 2] which fit within the cut-outs do not form a part of the seal.

The Examiner quite properly objects to the language "the continuous joint surface including the cut-out providing an upwardly extending sealing surface". This language has been amended out of the claim.

The Examiner then refers to Paper No. 8 and the statement "The other continuous joint surface includes a protrusion extending into (but not sealing) the cut-outs". The protrusion extends into the cut-outs; the protrusion is received in the cut-outs without interference by the cut-outs. Thus, because there is no interference between the protrusions and the cut-outs, the sealing surfaces can come together to form the seal.

As will hereinafter be set forth, applicants now use the term "first and second" when referring to the continuous joint surfaces. While the first surface "defines" a cut-out, this second surface "supports" a protrusion. When it is realized that the support of the protrusion and the defining of the cut-out is reversible, the use of the terminology in claim 11 becomes understandable.

The Examiner objects to the use of the terminology in claim 11 "the other continuous surface". This language has been amended utilizing the terms "first" and "second". Applicants will submit that by the use of these terms, this objection of the Examiner is rendered moot.

Finally, the question is posed as to whether the applicants claim the assembled or unassembled mixer. Applicants claim the assembled mixer, which has the advantage of being disassembled so that by machining on a surface without the "protrusions", the length of the mixing assembly can be conveniently and precisely adjusted. This will be made clear in the claim summary that follows.

Claim Rejections on the Merits

Claims 11-13 and 15-18 are rejected under 35 USC 102(e) as being anticipated by Streiff. In the remarks that follow entitled "Streiff Distinguished", it is pointed out that Streiff does not contain the equivalent of intermediate elements (2). Much more importantly, Streiff does not disclose or suggest in a protrusion/cut-out centered static mixer leaving either the mixer element or the intermediate element with an unobstructed surface that can be easily machined for precise length adjustment (0.1 mm) of the assembled static mixer.

Claims 11-13, 15, 16 and 18 have been rejected under 35 USC 102(b) as being anticipated by King '440. In the remarks that follow entitled "King Distinguished", applicants emphasize that King '440 has a system of protrusions on both sides of the disclosed elements that are placed together and does not contemplate a seal between the stacked elements. As a consequence of this construction, it is not possible to meet the limitation "whereby the first continuous joint surface defines an unobstructed planar surface to enable machining access for adjusting the length of the static mixer".

Claims 11-13, 17 and 19 are rejected under 35 USC 102(b) as being anticipated by Bokenkroger. In the remarks that follow entitled "Bokenkroger Distinguished", it will be shown that Bokenkroger relates to porous air filter type devices where a seal between the respective filter elements cannot occur. It will be submitted that this reference is completely non-analogous art.

The rejections then continue with a series of rejections combining at least some of the above references under 35 USC 103(a). Under the title "Obviousness Rejections", these rejections are individually discussed below.

Summary of the Invention of Claim 11

The claim relates to a static mixer. The mixer includes precision cast static mixer elements (1) arranged along a central axis (10), each precision cast static mixer element having a circumferential reinforcement region (4).

Unlike Streiff '644, the assembly includes intermediate elements (2). These intermediate elements abut the circumferential reinforcement region (4) and are formed in combination with the precision cast static mixer elements, a static mixer body of a preselected length with a periphery defined by the reinforcement region and the intermediate elements.

There are joints between the reinforcement region (4) and the intermediate elements (2). These joints define the first and second continuous joint surfaces (40a, 40b and 20a, 20b). These joints mutually define a seal formed between the first and second continuous joint surfaces between the reinforcement regions and the intermediate elements (2). It is to be noted that 40a, 40b and 20a, 20b are surfaces which end up always defining a seal when the combination is assembled. [See Figs. 1, 2 and 3].

The claim uses the wording "continuous joint surface". Turning to Fig. 1, it will be seen that surfaces 40a and 40b each are continuous and extend around the entire periphery of the central passage of the static mixer. Likewise, turning to Figs. 2 and 3, it will be seen that surfaces 20a and 20b each are continuous and extend around the entire periphery of the central passage of the static mixer. When these surfaces are abutted, they will come together and form the mutually define seal necessary to seal the static mixer. Fluid material from within the static mixer cannot flow through the formed seal to positions outside the static mixer.

A first continuous joint surface defines at least one cut-out having an upwardly extending cavity. In the case of Fig. 1, this is the cavity or cut-out (42). In the example of Fig. 1, this cut-out happens to appear on the reinforcement region about the static mixing element 3. A second continuous joint surface supports a protrusion for extending into the at least one cut-out of the first continuous joint surface. In the

example of Fig. 2, protrusion (21) is the member that extends into the at least one cut-out (42) in the reinforcement region (4). It is to be understood that with the system of reinforcement regions (4) and intermediate elements (2), the situation could as well be reversed.

It is vitally important that the system of cut-outs (42) and protrusions (21) does not interfere with the seals formed by continuous joint surfaces 40a, 40b and 20a, 20b. It is stated in amended claim 11 "the first continuous joint surface defining the at least one cut-out having an upwardly extending cavity of sufficient dimension for receiving the protrusion supported on the second continuous surface without obstruction within the cavity while permitting the first and second continuous joint surfaces to define the seal".

What is the advantage of this construction? The advantage is that the "first continuous joint surface defines an unobstructed planar surface to enable machining access for adjusting the length of the static mixer." In the words of the specification, this adjustment occurs to "a tolerance of about 0.1 mm"!

It is important to note that this part of the claim does not refer to the "second continuous joint surface". This is the surface that supports the protrusion. This surface will be obstructed and will prevent convenient machining. For example, the Examiner's attention is invited to Fig. 2. Continuous surface 20a cannot be conveniently machined without being obstructed by protrusions (21, 21'). A machinist attempting to adjust the length of the static mixer with the millimeter precision required by this disclosure would have to machine around protrusions (21, 21'). This is not the case with surfaces 40a and 40b shown in Fig. 1. A machinist attempting to adjust the length of the static mixer with the millimeter precision required by this disclosure can easily machine surfaces 40a and 40b [it being understood that cut-outs 42 form no impediment to such machining].

Streiff Distinguished

In order to understand Streiff U.S. Patent 6,394,644, it is necessary to briefly review Signer U.S. Patent 5,564,827, the reference upon which this disclosure improves. In the Signer reference, stacked static mixer elements 4 are placed between sleeve members 5. A system of bosses 45 and corresponding recesses 54 is used to key the respective static mixer elements 4 and sleeve members 5 together. This provided a system of static mixer devices that were generally accessible for maintenance and cleaning and visual inspection after use.

Streiff recognizes a serious drawback of this device. Recognizing that Signer is PCT publication number W095/09689, Streiff states at column 1, lines 34-44:

> It is also desired that static mixer devices must generally be accessible for maintenance and cleaning and visual inspection after use. One previously known method to provide access permitting cleaning and inspection is to support individual elements with a satellite type ring as is shown in International Publication WO 95/09689. This construction, however, requires expensive precision casting and costly machined spacer rings. .... (Emphasis added)

It is the purpose of applicants' invention to do away with the "costly machined spacer rings".

Streiff U.S. Patent 6,394,644 is not at all concerned with spacer rings. First, and viewing Streiff at Fig. 5, the static mixer has an outer seal constituting a pipe 62. It is into this pipe 62 that the individual elements 10a, 10b, 10c and 10d of the static mixer are placed.

This disclosure contains no equivalent of the pipe 62. Instead, reinforcement regions (4) only form the seal for the static mixer. There is no equivalent of the intermediate elements.

Streiff does have static mixer elements surrounded by edge surfaces. The surfaces appear at edge surfaces 22 (see Fig. 2 and Fig. 6A) and edge surfaces 24 (see Fig. 3 and Fig. 6B). However, it has no equivalent of applicants' intermediate elements (2). Each of the elements 10a, 10b, 10c and 10d are static mixer elements.

Thus the rejection equates some of the static mixer elements, say 10a and 10c, to intermediate elements (2) and others of the static mixer elements, say 10b and 10d, to precision cast static mixer elements (4).

If this assumption is made, it is instructive to turn to Figs. 6A, 6B and 6C of Streiff. As the rejection correctly notes, protrusions and cut-outs appear. However, protrusions 82, 83 interrupt the entire surfaces 22, 24. As a consequence, these surfaces 22, 24 do not extend without interruption around the central portion of the static mixer of Streiff. Similarly, cut-outs 81 interrupt the entire surfaces 22, 24.

If one were to adjust the length of these mixer elements placed one upon another, one would have to machine both protrusions 82, 83 and cut-outs 81. To preserve a seal between the cut-outs 81 and protrusions 82, 83, the machining of the protrusions and cut-outs would have to be precisely equal. Machining that is other than precisely equal would cause a leakage between the surfaces 22, 24, especially where the cut-outs 81 and protrusions 82, 83 mate. Further, as one can plainly see, machining at the base of the protrusions 82, 83 would require excruciating care to prevent leakage.

Compared to the machining of a single flat surface as set forth in this disclosure, the Streiff arrangement is incredibly laborious. This is why the successive mixer elements are loaded into pipe 62. The disclosure herein does not require the equivalent of pipe 62.

King Distinguished

King U.S. Patent 4,614,440 discloses stacked elements 20 which are best viewed in Fig. 4. These elements all include protrusions on the "biscuits" 10, 11 and 12 shown in Fig. 4. Two distinctions are present.

First, and referring to Fig. 3, the attention of the Examiner is drawn to the interval spacing 40 [see column 3, lines 31-52]. The purpose of the protrusions (which are apparently unlabeled) is to maintain a spatial separation between the biscuits 10, 11 and 12. As opposed to this construction, applicants' invention maintains a seal between adjacent mixing elements and intermediate elements.

Second, the surfaces along both sides of the "biscuits" 10, 11 and 12 include protrusions. Even if the surfaces were designed for contact to form a seal, one would have to precisely machine both the surfaces and the protrusions to obtain the result herein. As contrasted to this construction, it is only necessary that applicants machine to one surface to precisely adjust the length of the assembled mixer.

Bokenkroger Distinguished

Bokenkroger '348 cannot be said to suggest or disclose the "continuous joint surface" surrounding the central axis of the mixing element. First, the filter elements 9 "are made of an absorbent material such as felt, soft cardboard, pumice or any other porous material..." See column 2, lines 55 to 62. Second, these elements are obviously not intended at all for the construction contemplated herein where alternating elements are placed to seal, one against another. It is submitted that this reference is not in the same field as the invention claimed in claim 11.

Rejection under 35 USC 103 under Streiff '644 in view of Takeda et al.

Applicants agree with the Examiner that Takeda et al. includes an adaptor for a fiber optic connector including a spring steel cylinder. The obviousness rejection is traversed on two grounds. First, applicants submit that the art is complete non-analogous. Fiber optic connectors and static mixer element assemblies are completely different; it is not understood how one having ordinary skill in the art would ever associate these two. Second, fitting together of the mixer elements as set forth in claim 11 is the main invention herein. Streiff '644 simply does not disclose this combination.

Obviousness Rejections

Claim 14 has been rejected under 35 USC 103(a) as being unpatentable over Streiff '644 in view of Takeda et al. Applicants rely on the distinguishing of Streiff '644 to avoid this rejection. Applicants respectfully traverse the combination of an isolated part of a fiber optic connector with the intricately designed elements of claim 11.

Claim 19 has been rejected under 35 USC 103(a) as being unpatentable over Streiff '644. Applicants rely on their argument in distinguishing Streiff '644. Further, if it "would have been obvious to one of ordinary skill in the art to have varied duplicated the cutouts (sic)", applicants respectfully request that art be cited. Applicants submit that the invention of claim 11 as limited by claim 19 is not obvious over the art of record.

Claim 14 is rejected under 35 USC 103(a) over King in view of Takeda et al. Applicants rely on their argument distinguishing King. Simply stated, the combination does not include a seal as set forth in claim 11; instead the combination would include the deliberate spatial separation between the elements.

Claim 17 is rejected under 35 USC 103(a) over King. Applicants rely on their remarks distinguishing King. King has deliberate spatial separations between his respective elements. He does not contemplate the system of seals with protrusion and cut-outs contemplated by this invention.

Claim 19 is rejected under 35 USC 103(a) over King and (apparently) Bokenkroger. Applicants rely on their previous remarks distinguishing both of these references. Bokenkroger relates to a porous air filter. King has deliberate spatial separations between his elements (no seal). It is submitted that nothing in these references suggests their combination and that the combination is inoperative.

Finally, claim 14 is rejected under 35 USC 103(a) under Bokenkroger in view of Takeda et al. Applicants rely on their argument distinguishing Bokenkroger. It is not seen how a porous air filter held together by a slit elastic cylinder from an optical

fiber connector can have anything to do with static mixer elements and intermediate elements forming seals with aligned protuberances and cut-outs.

The Examiner has cited Hewlett-Packard Co. v. Bosch & Lomb Inc., 15 USPQ2d 1525 (Federal Circuit; 1990) for the proposition "apparatus claims cover what a device is, not what a device does". Applicants' attorney has read this case. It relates to a situation where the claimed structure is different than that shown by the prior art. Noting that the claims structure was different than the prior art, the court held that the patent at issue was valid and infringed.

Here applicants claim structure. The structure claimed is a seal system. This seal system has two continuous surfaces which form a seal and a system of cut-outs and protuberances which align the sealed members. One of the aligned members (the one with the cut-outs) defines an unobstructed surface which can be easily machined in this combination.

As set forth in the Hewlett-Packard case, this is not an "operational difference". In the words of that case:

> An invention need not *operate* differently than the prior art to be patentable, but need only *be* different. (Italics in the original) 15 USPQ2d 1526

Applicants submit that their device is non-obviously different.

CONCLUSION

In view of the foregoing, applicants believe all claims now pending in this application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,

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CLAIMS APPENDIX
(current wording of all pending claims)

Claim 11 (currently amended): A static mixer comprising:

precision cast static mixer elements (1) arranged along a central axis (10), each precision cast static mixer element having a circumferential reinforcement region (4);

intermediate elements (2) abutting the circumferential reinforcement region (4) and forming in combination with the precision cast static mixer elements a static mixer body of a preselected length with a periphery defined by the reinforcement region and the intermediate elements; and

joints between the reinforcement region (4) and the intermediate elements (2) defining first and second continuous joint surfaces (40a, 40b and 20a, 20b) and mutually defining a seal formed between the first and second continuous joint surfaces between the reinforcement regions (4) and the intermediate elements (2);

a first continuous joint surface defining at least one cut-out having an upwardly extending cavity;

a second continuous joint surface supporting a protrusion for extending into the at least one cut-out of the first continuous joint surface for positioning the reinforcement region and the intermediate elements at the seal of the first and second continuous joint surfaces with respect to each other;

the first continuous joint surface defining the at least one cut-out having an upwardly extending cavity of sufficient dimension for receiving the protrusion supported on the second continuous surface without obstruction within the cavity while permitting the first and second continuous joint surfaces to define the seal,

whereby the first continuous joint surface defines an unobstructed planar surface to enable machining access for adjusting the length of the static mixer.

Claim 12 (currently amended): The static mixer of claim 11 wherein:

the reinforcement regions (4) of the precision cast static mixer elements (1) are ring-shaped;

the reinforcement regions (4) have the first continuous joint surface defining cut-outs (41, 41', 42, 42') configured in the reinforcement regions (4); and

the second continuous joint surface supports the protrusion (21, 21', 22, 22', 23) from the continuous joint locations (20a, 20b) of at least one intermediate element (2), the projecting part having a shape complementary to a shape of the cut-outs.

Claim 13 (currently amended): The static mixer of claim 12 wherein:

at least some of the protrusions are separate parts (23) fitted into cut-outs (25) in the intermediate elements (2).

Claim 14 (previously added): The static mixer of claim 11 further including:

a longitudinally slit cylinder (5) of resiliently elastic sheet metal lamina holding the precision cast static mixer elements (1) at the reinforcement region (4) and the intermediate element (2) together.

Claim 15 (previously added): The static mixer of claim 11 and wherein:

the precision cast static mixer elements (1) each comprise a gridwork (3) of webs (31) which are arranged in layers oriented parallel to the central axis (10) with the webs of adjacent layers crossing one another.

Claim 16 (previously added): The static mixer of claim 15 and wherein:

the webs of adjacent layers cross one another and enclose angles between 10° and 70°.

Claim 17 (previously added): The static mixer of claim 11 and wherein:

the precision cast static mixer elements (1) are manufactured from the group consisting of a metallic alloy, a ceramic material, and a plastic.

Claim 18 (previously added): The static mixer of claim 15 and wherein:

the gridwork (3) of webs (31) is co-cast with the reinforcement regions (4).

Claim 19 (previously added): The static mixer of claim 12 wherein:

first cut-outs (41, 41') are configured on one side of the reinforcement regions (4); and

second cut-outs (42, 42') are configured on the other side of the reinforcement regions (4) and displaced 90° from the first cut-outs (41, 41').